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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/680,379

10/06/2003

Hagen Klauk

MUH-12807

5870

27346 7590 01/11/2008  
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EXAMINER

CHACKO DAVIS, DABORAH

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

01/11/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/680,379

Applicant(s)

KLAUK ET AL.

Examiner

Daborah Chacko-Davis

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-15, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 5,942,374 (Smayling) in view of Japanese Patent No. 09-083040 (Aomori et al., hereinafter referred to as Aomori) and U. S. Patent No. 5,811,358 (Tseng et al., hereinafter referred to as (Tseng)).

Smayling, in the abstract, in col 1, lines 58-67, in col 2, lines 1-16, in col 5, lines 21-67, discloses a method of doping an organic conductive layer wherein a substrate is coated with a polyimide, and doped with a dopant gas followed by exposure through a mask to radiation so as to form a doped region (fixing the doping substance in the polyimide layer via a covalent bond, i.e., conjugated sequences of single and double bond, the doped region becomes conducting). Smayling, in col 10, lines 12-17, discloses that the remaining portion (less doped, residual dopant) of the mask layer (polyimide or PR) is removed. Smayling, in col 6, lines 56-67, discloses a gate electrode provided with a layer that is less transmissive (a more absorbing layer, light opaque regions) above the gate electrode resulting is a less irradiated region (unexposed sections). Smayling, in col 5, lines 35-42, discloses that the organic layer is heavily irradiated so as to form a doped and undoped region in the polyimide layer such

that the source and drain regions are in electrical contact with the doped portion of the doped polyimide region having increased electricity (see figure 1, current flows from reference 18 to reference 20 via channel reference 24). Smayling, in col 1, lines 57-67, in col 2, lines 1-17, in col 4, lines 1-54, discloses that the substrate is transparent to radiation (glass), forming source region, drain region spaced apart from the gate region, forming a gate dielectric (gate insulating region) positioned spaced apart from the source and drain regions (first and second region) and spaced apart from the gate electrode, wherein the source, the drain, the gate insulator, the gate electrode are spaced apart with the organic semiconducting layer. Smayling, in col 10, lines 1-29, discloses that after the removal of the undoped regions of the mask, the now exposed regions (masked previously) of the polyimide is restored i.e., the neutral polyimide in the unexposed regions that were previously n-doped and p-doped regions, after the removal of the mask layers, is restored to its original conductivity (claims 1-3, 6-9, 12). Smayling, in col 5, lines 43-49, in col 7, lines 1-8, discloses that the exposure is performed section by section (selectively scan one portion at a time) (claims 4, 10-11). Smayling, in col 6, lines 56-58, discloses that the exposure is performed through a mask (claim 5). Smayling, in col 1, lines 65-67, in col 2, lines 1-3, discloses that the source region, the drain region and the gate region are simultaneously formed on the substrate (claim 13). Smayling, in col 10, lines 60-67, discloses that the gate insulating material includes material transparent to radiation (transmissive regions, reference 20a of layer 16, see figure 15) (claims 14-15).

The difference between the claims and Smayling is that Smayling does not disclose that the doping substance in the organic compound is in regions adjoining the source contact and the drain contact. Smayling does not disclose that the organic semiconductor is applied directly with the contact region to the substrate. Smayling does not disclose that the unbounded doping substance is removed at reduced pressure or elevated temperature.

Aomori, in the abstract and in figures 1a through 1d, discloses that the organic semiconductor layer (reference 7) is in direct contact with the contact region and the doping substance in the organic semiconducting layer is in the region that adjoins the source and drain contact.

The difference between the claims and Smayling in view of Aomori is that Smayling in view of Aomori does not disclose that the unbounded doping substance is removed at reduced pressure or elevated temperature.

Tseng, in col 2, lines 65-67, in col 3, lines 1-3, and in col 4, lines 10-14, discloses that the remaining part of the implant-hardened photoresist is removed via stripping at elevated temperatures.

Therefore, it would be obvious to a skilled artisan to modify Smayling by employing the method of contacting the contact region via the organic semiconducting layer and maintaining the doped substance in a region that adjoins the source and drain contact because Smayling, in col 8, lines 26-58, discloses that interconnect polymer layer (organic semiconducting layer) is formed on the contact regions (contacts) and the interconnect polymer layer has been irradiated i.e., it has a dopant concentration, and

the interconnect layer is positioned in a region between the contacts (source and drain), and Aomori, in the abstract, discloses that employing a organic semiconducting layer in the claimed manner enables the formation of a high performance thin film transistor. Therefore, it would be obvious to a skilled artisan to modify Smayling in view of Aomori by employing elevated temperatures while removing the unbound doped substance present in the resist to be removed as taught by Tseng, because Tseng, in col 4, lines 1-220, discloses that elevating the temperatures during the stripping process, that removes a portion of the photoresist that has unbound dopants (implants) enables better efficiency by effectively stripping the photoresist at an increased reaction rate.

### ***Response to Arguments***

3. Applicant's arguments, see Amendment and Remarks, filed October 26, 2007, with respect to claims 1-15, have been fully considered and are persuasive. Therefore, the 103 rejection of claims 1-15, made in the previous office action (paper no. 20070723) has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Tseng. See paragraph no. 2.

A) Applicants argue that Smayling does not disclose removing unbound doping substance at reduced pressure or elevated temperature.

Smayling teaches doping a polyimide layer selectively (see col 10, lines 1-17) and the unbound doping substance present atop the organic compound (i.e., the polyimide layer) is removed i.e., reference 58, of figure 13, is the portion that contains

unbound doping substance, and is removed after the irradiation process. Smayling is not depended upon to disclose that the removal of the unbound doping substance at the reduced pressure or elevated temperature. Tseng is depended upon to disclose the removal of unbound doping substance at elevated temperatures.

B) Applicants argue that Aomori does not disclose an organic semiconductor that contains a doping substance.

Aomori discloses contacting (electrically) of the organic semiconducting layer with the source and drain electrodes (see figures 1a through 1d) i.e., dopants are present in the organic semiconducting layer that is in contact with the source and drain electrodes (references 4, and 5).

### ***Conclusion***

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status

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information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

A handwritten signature in black ink, appearing to read "Abraham Lincoln", is written over the "dcd" text.

January 5, 2008.